Generic allocation of the enigmatic scincid lizard *Lygosoma inconspicuum* F. Müller, 1895 (Squamata: Scincidae) from Sulawesi

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Abstract: The holotype and only known specimen of *Lygosoma* (*Leiolepisma*) *inconspicuum* F. Müller, 1895 is redescribed and demonstrated to belong to the genus *Lipinia*, rather than *Scincella*, to which it has long been ascribed. Transfer of the species to *Lipinia* removes the biogeographic anomaly of a *Scincella* species occurring in Wallacea, distant from the distribution of the rest of the genus in Asia. *Lipinia inconspicua* is the first species of *Lipinia* in Sulawesi with an external ear, and is most similar to *Lipinia auriculata kempi* from the Philippines.

Key words: *Lipinia*, Sarasin, systematics, Sulawesi.

Introduction

Among the extensive herpetological collections made in Sulawesi by the Swiss zoologists Fritz and Paul Sarasin in 1893-1896 was a small nondescript skink, named as *Lygosoma inconspicuum* by Friedrich Müller in 1895. The holotype was redescribed by Boulenger (1897), who continued to place it in *Lygosoma*, along with the majority of the world's skink fauna at that time. When *Lygosoma* was eventually dismantled by Mittleman (1952), *inconspicuum* was transferred to *Scincella*, becoming *Scincella inconspicua*. However, Mittleman's assignment of species to genera was predominantly based on previous descriptions rather than the re-examination of specimens, and hence many of his allocations remain to be confirmed. The species has continued to be listed as a species of *Scincella* by most subsequent authors (Greer 1974; Kramer 1979; Welch et al. 1990; Iskandar & Tjan 1996; Wrobel 2004; Linkem et al. 2011; Koch 2012; Hedges 2014), although Wanger et al. (2011) list it as *Lipinia inconspicua*, without providing any discussion.

The placement of this species in *Scincella* is geographically anomalous, as it is the only species in the genus occurring in Sulawesi, and no other species of *Scincella* occurs as far south as Peninsular Malaysian (Grismer 2011) or in Indonesia (de Rooij 1915). The most recent revision of the genus in south-east Asia (Ouboter 1986) failed to mention the species.

Although described by both Müller (1895) and Boulenger (1897), both descriptions are brief and emphasise traditional characters. Hence, I here provide a more extended description of the holotype, and use this to reconsider its affinities and generic identity.

Materials and methods

The holotype of *Lygosoma inconspicuum* in the Naturhistorisches Museum Basel (NHMB) was examined on two occasions, firstly for an extended period on loan to the Australian Museum in 1999–2001, and more recently during a brief visit to the NHMB collection in 2015. Some comparative material of geographically proximate populations of *Lipinia noctua* was examined in the collections of Naturalis (Nationaal Natuurhistorisch Museum, Leiden, the Netherlands; RMNH) and the Museo Civico di Storia Naturale di Genova, Italy (MSNG).

Head shield nomenclature follows Taylor (1935).

Measurements were made with the structure held straight against a steel rule, or (for head measurements) with dial callipers, both sets of measurements taken with the instrument examined under a dissecting microscope to ensure correct placement. Head measurements are to the nearest 0.1 mm; other measurements are to the nearest 0.5 mm. Snout-vent length (SVL) is from tip of snout to posterior edge of median precloacal scales, along the ventral surface; axilla-groin length (AGL) is from the posterior junction between forelimb and body wall, to the anterior junction between hindlimb and body wall, with the limbs held at right angles to the body axis; forelimb length (FLL) and hindlimb length (HLL) are from the medial extremity of the posterior crease between limb and body wall, to the tip of the claw, with the limb held at right angles to the body; head length (HL) is from the tip of the snout obliquely to the anteriormost margin of the external ear aperture; head width (HW) is at the widest point of the head, and head depth (HD) is at the deepest point of the head over the parietal table, including the lower jaw, at right angles to the labial margin.

Redescription of the holotype of *Lygosoma inconspicuum*

The holotype (NHMB 4742; Plate 2 fig. 1) is a mature but non-reproductive female.

Scalation: Nasals moderately separated (by a distance about 1/3 of the width of the frontonasal) by median dorsal lobe of rostral; prefrontals moderately separated by contact of frontonasal with frontal; frontoparietals medially fused; interparietal with parietal eye at junction of middle and posterior thirds; parietals in broad contact posterior to interparietal; nuchals in three pairs; supraoculars four, first two contacting frontal; supraciliaries nine, in linear contact with supraoculars, first supraciliary in contact with frontal; upper postocular extending into supraciliary row, becoming the penultimate supraciliary; last two supraciliaries larger, and extend medially posterior to fourth supraocular.

Nostril central in nasal; anterior and posterior loreals squarish; preocular single, separated from frontonasal by contact of posterior loreal with first supraciliary; presuboculars three, interdigitating with supralabials; 3L/4R small granules of lower eyelid separating pre- and postsuboculars along dorsal margin of subocular supralabials; postsuboculars four, lowermost interdigitating with supralabials; lower eyelid with an opaque rounded window; primary temporal single; secondary temporals two, lower overlapped by upper; upper secondary temporal separated from nuchals by a single scale; lower secondary temporal followed by two successive tall tertiary temporals; ear large, broadly ovoid, long axis vertical; tympanum thin but shallow-set, lacking lobules along margins.

Mental wider than long; postmental in contact with first two infralabials on each side; four pairs of enlarged chin shields, all laterally in contact with infralabials; first pair of chin shields in medial contact; second and third pairs separated by a single median scale; fourth pair separated by three scales.

Body scales smooth and glossy, in 22 longitudinal rows at midbody; paravertebral scales slightly wider than adjacent dorsal scales, 56 from parietals to level of anterior margin of hindlimb, 59 to level of posterior margin of hindlimb; median pair of preanals enlarged, laterally overlapping adjacent preanals; fourth toe with paired scales above to base of fourth phalanx; last two (L) or three (R) supradigital scales single; lamellae below fourth toe 19L/20R, basally slightly broadened, distally (distal to second phalanx) distinctly narrower; toes 3–5 distinctly angulate, with an oblique dorsal deviation of the digit at the proximal interphalangeal joint of digits 3 and 5, and at the second interphalangeal joint of digit 4, then a return to a horizontal orientation at the subsequent interphalangeal joint (Plate 3 fig. 1).

Measurements: Snout-vent length (SVL) 50 mm; axilla-groin length 26.5 mm (53.0% of SVL); forelimb length 11 mm (22.0% of SVL); hindlimb length 17 mm (34.0% of SVL); head length (HL) 9.6 mm (19.2% of SVL); head width 6.0 mm (62.5% of HL); head depth 4.5 mm (46.9% of HL).

Coloration: Dorsum pale grey-brown, with a pair of oblique dark-brown blotches on the parietals, a pair of rounded dark spots over the nuchal region, then a few asymmetrically arranged dark spots paravertebrally over the posterior neck and forebody. A narrow dark upper lateral stripe from the posterior canthus of the eye, above the ear, and widening at the level of the forelimb, extending to the tail base. The upper edge of this stripe is sharply defined, and lies in the middle of the third dorsal scale row; the lower edge less well-defined, on scale row 5.

Face and lower flanks of body paler brown. Venter yellow, throat with pale-brown macules and clouding. Soles of feet weakly variegated with brown.

Parietal peritoneum black; visceral peritoneum on oviducts and ovaries unpigmented.

The above description is based on the specimen when first viewed in 2000. On my second examination of the specimen in 2015, it had darkened considerably in preservative (Plate 2 fig. 1).

Type locality

The type locality as stated by Müller (1895)

was "Boelawa-Gebirg circa 1200 m." (Boelawa Mountain, circa 1200 m), a locality subsequently given as "Bone Mtns, 3900 ft" by Boulenger (1897). Boelawa Gebirge is now Huidu Matabulawa, in the Bone Mountains. Comparison of the accounts of Sarasin and Sarasin (1894, 1905), and the map accompanying the former account indicates that the Sarasin brothers approached from the west, following the Bone River (Sungai Bone) upstream from Gorontalo. On 16 January 1894, they left the river headwaters, and continued to approach Huidu Matabulawa, reaching 1250 m, where they built a hut to shelter from a storm, and then later that day attaining about 1500 m to the south of the main peak, before descending the steep eastern side of the mountain to the valley of the Totoija (Pungea) River on 17 January, and following it downstream to Negeri Lama, reaching the coast on 21 January. Transferring the route to modern maps gives the coordinates of the type locality (at 1200 m) as approximately 0°30'N, 123°38'E. The locality is in South Bolaang Mongondow Regency, North Sulawesi Province.

Discussion

The placement of *Lygosoma* (*Leiolepisma*) *inconspicuum* in *Scincella* by Mittleman (1952) occurred at a time when the distinction between *Scincella* and *Lipinia* was poorly defined. The diagnoses provided by Mittleman (1952) did not provide any useful distinction between the two genera ("prefrontals large, forming a median suture; frontonasal at least as long as it is wide .....; preanals prominently enlarged" for *Lipinia* *vs* "prefrontals large, often forming a median suture; preanals prominently enlarged" for *Scincella*). Greer (1974) provided more extensive comparative diagnoses when recognising both as window-eyed members of what would become the tribe Sphenomorphini Welch 1982, with *Lipinia* lacking a postorbital bone, possessing (in most species) a colour pattern of strongly alternating dark and light stripes, small clutch size (one or two in most species), and dilated basal subdigital lamellae (in many species), while *Scincella* possesses a postorbital bone (in most species); lacks a pattern of alternative dark and light stripes, has a much larger clutch size, and lacks dilated basal subdigital lamellae. To these differences, Shea and Greer (2002) added the condition of the lower secondary temporal scale overlapping the upper secondary temporal scale in most *Scincella*, a character not present in *Lipinia*. Das and Greer (2002) provided a further list of "derived character states" (presumably intended as apomorphies, but without a formal cladistic analysis or identification of outgroups for polarisation) for *Lipinia* within the context of the Sphenomorphini, but did not provide comparative data for *Scincella*.

Scincella as defined by Greer (1974) has been subject to some modification. Some Himalayan species were transferred by Eremchenko (1987) to a new subgenus, *Himalblepharus*, in *Asymblepharus* Jeriomtschenko, Szczerbak, 1980, a genus originally established for a single species, *Ablepharus alaicus* Elpatjevsky, 1901, while several South Indian species were transferred to a new genus *Kaestlea* by Eremchenko and Das (2004). Balancing this loss of species to other genera, Greer and Shea (2003) subsumed the monotypic genus *Paralipinia* Darevsky, Orlov, 1997 into *Scincella*, and Nguyen *et al*. (2011) transferred to *Scincella* several species of Vietnamese skinks that had previously been described in the genus *Sphenomorphus*.

While neither *Scincella* or *Lipinia* have yet been subject to extensive sampling of their entire morphological envelopes in published genetic analyses, Linkem et al. (2011) and Pyron et al. (2013) did identify the two genera as distinct from each other on the limited sampling so far available, and unpublished analyses including additional species by Linkem (2013, pers. comm.) confirm this, although *Lipinia* itself was not recovered as monophyletic, but represented three distinct lineages (Linkem 2013).

The type species of *Lipinia*, *L. pulchella* Gray, 1845, was identified as part of a group of four *Lipinia* species with a distinct tympanum and a windowed lower eyelid. *Lipinia leptosoma* from Palau, originally described in the genus *Aulacoplax* Brown & Fehlmann, 1958, and with an extreme dilation of subdigital lamellae but a scaly (not windowed) lower eyelid (the only *Lipinia* species with these characters), represented a separate group, and two species of *Lipinia* with the tympanum covered with scales were a third group. All three groups were recovered as allied to different genera of sphenomorphin skinks. These three morphotypes are more broadly distributed in *Lipina*, with the majority of species falling into the first group, and eight species, *L. inexpectata* (Das & Austin, 2007), *L. infralineolata* (Günther, 1873), *L. nitens* (Peters, 1871), *L. quadrivittata* (Peters, 1867), *L. relicta* (Vinciguerra, 1892), *L. sekayuensis* Grismer et al., 2014, *L. subvittata* (Günther, 1873) and *L. surda* (Boulenger, 1900), representing the earless group, most of which also have the fourth supralabial (*vs* usually the fifth) below the centre of the eye, fused frontoparietal scales, and 22 or fewer modal midbody scales, characters rare in other *Lipinia* species,

Austin (1995; 1998) similarly recovered *Lipinia leptosoma* as the most basal lineage to other eared *Lipinia,* although his sampling of species outside *Lipinia* was insufficient to demonstrate the polyphyly demonstrated by Linkem (2013).

Sampled representatives of the earless group were also recovered as a distinct genetic lineage of *Lipinia* by Das and Austin (2007, n = 2 species) and Grismer et al. (2016, n = 6 species), although again the sampling of taxa outside *Lipinia* was insufficient to demonstrate polyphyly of the genus. Most of the species in the earless group (4 of 5 species studied) were recovered as a clade in a preliminary cladistic analysis of morphology by Das and Greer (2002). The generic name *Cophoscincus* Peters, 1867 is available for the earless group, should further more extensive studies confirm its monophyly together with polyphyly of *Lipinia*.

With only a single specimen known of the species, I have not been able to examine the skull of *Lygosoma inconspicuum* to determine the presence or absence of the postorbital bone, and the holotype is not gravid, precluding determination of clutch size. However, on external morphology, *Lygosoma inconspicuum* falls into the range of variation of *Lipinia*, and more specifically, it does not show morphological similarity to either *Lipinia leptosoma* or the earless clade of *Lipinia*, but lies within the nominotypic group of *Lipinia* in having an exposed tympanum and the fifth supralabial below the eye and separating pre- and postsubocular scale series. It differs from *Scincella* in having the lower temporal scale overlapped by the upper secondary temporal, and has distinctly dilated basal subdigital lamellae, as in many *Lipinia*, and the digits, particularly toe 4, show the arched distal extremity present in some arboreal species of *Lipinia*, with a further shortening of the antepenultimate phalanx on the fourth toe in some of these species (Shea & Greer 2002). The colour pattern is not of strongly contrasting pale and dark stripes, regarded as diagnostic of *Lipinia* by Greer (1974), but some other recently recognised *Lipinia* species also lack these (Günther 2000; Shea & Greer 2002; Grismer et al. 2014; 2016), and the lack of dark markings along the mid-vertebral line, flanked by dark paravertebral spots, does hint at the pale vertebral stripe of many *Lipinia* species.

Hence, because of the enlarged subdigital lamellae and arched terminal ends of the digits, and the lower secondary temporal scale overlapped by the upper secondary temporal scale, I formally transfer *Lygosoma* (*Leiolopisma*) *inconspicuum* Müller, 1895 from *Scincella* to *Lipinia*, as *Lipinia inconspicua*. The biogeographic anomaly of *Scincella* in Sulawesi is resolved, with *inconspicua* instead being part of a genus widespread in Indonesia, Papua and the Philippines. This transfer also follows previous transfers to *Lipinia* of a number of other species assigned by Mittleman (1952) to *Scincella*: *miota* Boulenger, 1895 (now a synonym of *L. noctua*; Zweifel 1979), *macrotympanum* Stoliczka, 1873, *pulchra* Boulenger, 1903, *semperi* Peters, 1867, *vittigera* Boulenger, 1894, and *vulcania* Girard, 1858 by Greer (1974), *subnitens* Boettger, 1896 (as a synonym of *L. noctua*) by Zweifel (1979), and *nitens* Peters, 1871 by Das and Greer (2002).

Within *Lipinia*, *inconspicua* differs from the earless species in possessing a distinct tympanum. It is one of only three species among the non-earless *Lipinia* with fused frontoparietals. Variation in scalation of *L. pulchra*, a species of north-eastern New Guinea, is poorly studied, but Zweifel (1979) reported the species to routinely have fused frontoparietals, and based on the type description of two specimens, it has slightly more midbody scales (24 vs 22) and more subdigital lamellae (22 vs 19-20). Better sampling may efface these differences, but *L. pulchra* has a very different colour pattern to *L. inconspicua*, with a narrow pale vertebral stripe from tip of snout to midbody, terminated by median fusion of broad dark paravertebral stripes, themselves terminating at the base of the tail, where they are replaced by median fusion of pale dorsolateral stripes that commence at midbody and continue (fused) to the tail tip (Zweifel 1979).

In the widespread *L. noctua*, there is marked variation in the fusion of the frontoparietals, with higher frequencies in south-eastern New Guinea (Zweifel 1979). However, the nearest populations of *L. noctua* to *L. inconspicuum*, from the northern Maluku Islands (Morotai, Halmahera, Ternate), and to which the subspecific name *ternatensis* was applied by Peters and Doria (1878), have very low frequencies of fusion of the frontoparietals (Zweifel 1979), and distinctively different colour pattern motif, with a partly or fully longitudinally coalescing series of large dark paravertebral blotches, leaving a pale vertebral stripe with sharp edges at least anteriorly, and more laterally, a pair of pale dorsolateral stripes. Zweifel (1979) only had samples of this form from Morotai, but I can confirm that this motif is also present on Halmahera (RMNH.RENA 5466, Tobelo) and Ternate (three syntypes of *Lygosoma* *noctua* var. *ternatensis*, MSNG 27976; Plate 3 fig. 2), while specimens from the adjacent Vogelkop of New Guinea (RMNH.RENA 7293, Fak Fak; 48421-22, 48424, Ajamaroe; 48423, Erokwera) have the more typical colour pattern of *L. noctua*. Both the Malukan and Vogelkop populations of *L. noctua* have a greater number of midbody scales than *L. inconspicua* (24-26 vs 22).

The presence of fused frontoparietals is also geographically linked in *Lipinia auriculata* (Taylor, 1917) of the Philippines (Brown & Alcala 1956; 1980), with the nominate subspecies and *L. a. kempi* (Taylor, 1919) possessing fused frontoparietals, but *L. a. herrei* (Taylor, 1922) having paired frontoparietals. *Lipinia inconspicua* differs from *L. a. auriculata* in having distinct prefrontals (*vs* usually fused to the frontonasal), but is similar in most respects to *L. a. kempi* of Minoro and Tablas Islands in the Central Philippines, including a colour pattern that usually involves dark blotches on the paravertebral scale rows (Brown & Alcala 1980). Detailed descriptions of variation in scalation are unavailable for *L. a. kempi*, but the illustration of the head shields of the holotype provided by Taylor (1919) does show only three pairs of enlarged chin shields, with only the second pair separated by a single median scale, while the holotype of *Lygosoma inconspicuum* has four pairs of chin shields, with both second and third pairs separated by a median scale.

Within Sulawesi, *L. inconspicua* is the only species of *Lipinia* possessing an external tympanum; the other two species reported from the island (*L. infralineolata* and *L. subvittata*; Koch 2012) are earless.

Given the angulation of the longer digits of *L. inconspicua*, it is likely that, like many *Lipinia* species, it is arboreal. This, in combination with small size and a distribution in a remote part of North Sulawesi, may explain the lack of modern records of the species. Similar difficulties in sampling exist for several species of *Lipinia* (Smith 1935; Brown & Alcala 1963; Das 1997; Grismer 2011; Bucklitsch et al. 2012; Supsup et al. 2016).

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References

Austin C.C. 1995. Molecular and morphological evolution in South Pacific scincid lizards: morphological conservatism and phylogenetic relationships of Papuan *Lipinia* (Scincidae). – *Herpetologica* **51**, No 3: 291–300.

Austin C.C. 1998. Phylogenetic relationships of *Lipinia* (Scincidae) from New Guinea based on DNA sequence variation from the mitochondrial 12S rRNA and nuclear *c-mos* genes. – *Hamadryad* **23**, No 2: 93–102.

Boettger O. 1896. Reptilien und Batrachier aus Deutsch-Neu-Guinea. – *Abhandlungen und Berichte des Königlichen Zoologischen und Anthropologisch-Ethnographischen Museums zu Dresden* **6**, No 7: 1–3.

Boulenger G.A. 1894. A list of reptiles and batrachians collected by Dr. E. Modigliani on Sereinu (Sipora), Mentawei Islands. – *Annali del Museo Civico di Storia Naturale di Genova, Series 2,* **14**: 613–618.

Boulenger G.A. 1895. On a collection of reptiles and batrachians from Ferguson Island, D'Entrecasteaux group, British New Guinea. – *Annals and Magazine of Natural History, Series 6,* **16**, No 91: 28–32.

Boulenger G.A. 1897. A catalogue of the reptiles and batrachians of Celebes with special references to the collection made by Drs F. and P. Sarasin 1893-1896. – *Proceedings of the Zoological Society of London* **1897**, No 1: 193–237.

Boulenger G.A. 1900. Descriptions of two new lizards from Selangor. – *Journal of the Bombay Natural History Society* **13**, No 2: 333–335, 1 plate.

Boulenger G.A. 1903. Descriptions of new reptiles from British New Guinea. – *Proceedings of the Zoological Society of London* **2**, No 8: 125–129, pls xii-xiii.

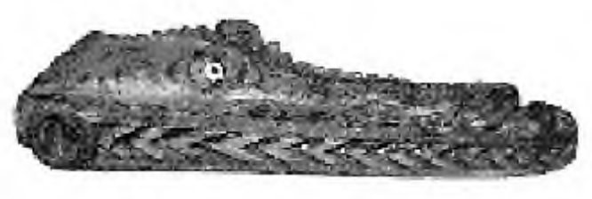
Brown W.C., Alcala A.C. 1956. A review of the Philippine lizards of the genus *Lygosoma* (*Leiolopisma*). – *Occasional Papers of the Natural History Museum of Stanford University* **3**: 1–10.

Brown W.C., Alcala A.C. 1963. Additions to the Leiolopismid lizards known from the Philippines, with descriptions of a new species and subspecies. – *Proceedings of the Biological Society of Washington* **76**: 69–80.

Brown W.C., Alcala A.C. 1980. *Philippine lizards of the family Scincidae*. Dumaguete City, Silliman University Press: xi + 264 pp.

Brown W.C., Fehlmann A. 1958. A new genus and species of arboreal scincid lizard from the Palau Islands. – *Occasional Papers of the Natural History Museum of Stanford University* **6**: 1–7.

Bucklitsch Y., Geissler P., Hartmann T., Doria G., Koch A. 2012. Rediscovery and redescription of the holotype of *Lygosoma vittigerum* (=*Lipinia vittigera*) Boulenger, 1894. – *Acta herpetologica* **7**, No 2:



325–329.

Darevsky I.S., Orlov N.L. 1997. A new genus and species of scincid lizard from Vietnam: first Asiatic skink with double rows of basal subdigital pads. – *Journal of Herpetology* **31**, No 3: 323–326.

Das I. 1997. Rediscovery of *Lipinia macrotympanum* (Stoliczka, 1873) from the Nicobar Islands, India. – *Asiatic Herpetological Research* **7**: 23–26.

Das I., Austin C.C. 2007. New species of *Lipinia* (Squamata: Scincidae) from Borneo, revealed by molecular and morphological data. – *Journal of Herpetology* **41**, No 1: 61–71.

Das I., Greer A.E. 2002. *Lipinia nitens* (Peters, 1871): discovery of a second specimen and a redescription of the holotype. – *Raffles Bulletin of Zoology* **50**, No 2: 483–485.

de Rooij N. 1915. *The reptiles of the Indo-Australian Archipelago. I. Lacertilia, Chelonia, Emydosauria*. Leiden, E.J. Brill: xiv + 384 pp.

Elpatjevsky V.S. 1901. [The genus *Ablepharus* Fitz. in the collections of the Zoological Museum of Moscow University]. – *Dnevnik Zoologischeskogo odeleniya Imperatorskogo obszestva lyubitelei estestvoznania, antropologii i etnographii, Moscow* **3**, No 2: 37–39 [in Russian].

Eremchenko V.K. 1987. [Systematics and relationships of Indo-Himalayan scincells (Sauria: Scincidae)]. - *Izvestiya Akademii Nauk Kirgizskoy S.S.R., Frunze, Khimiko-tekhnologischeskie nauki* **2**: 54–57 [in Russian].

Eremchenko V.K., Das I. 2004. *Kaestlea*: a new genus of scincid lizards (Scincidae: Lygosominae) from the Western Ghats, south-western India. – *Hamadryad* **28**, No 1/2: 43–50.

Girard C. 1858. Descriptions of some new Reptiles, collected by the United States Exploring Expedition, under the command of Capt. Charles Wilkes, U.S.N. Fourth Part. – Including the species of Saurians, exotic to North America. – *Proceedings of the Academy of Natural Sciences of Philadelphia* **1857**: 195–199.

Gray J.E. 1845. *Catalogue of the specimens of lizards in the collection of the British Museum*. London, British Museum: xxviii + 289 pp.

Greer A.E. 1974. The generic relationships of the scincid lizard genus *Leiolopisma* and its relatives. – *Australian Journal of Zoology, Supplementary Series* **31**: 1–67.

Greer A.E., Mys B. 1987. Resurrection of *Lipinia rouxi* (Hediger, 1934) (Reptilia: Lacertilia: Scincidae), another skink to have lost the left oviduct. – *Amphibia-Reptilia* **8**, No 4: 417–418.

Greer A.E., Shea G.M. 2003. Secondary temporal scale overlap pattern: a character of possible broad systematics importance in sphenomorphine skinks. – *Journal of Herpetology* **37**, No 3: 545–549.

Grismer L.L. 2011. *Lizards of Peninsular Malaysia, Singapore, and their Adjacent Archipelagos. Their description, distribution and natural history*. Frankfurt am Main, Edition Chimaira: 728 pp.

Grismer L.L., Ismail L.H.B., Awang M.T., Rizal S.A., Ahmad A.B. 2014. A new species of lowland skink (genus *Lipinia* Gray, 1845) from northeastern Peninsular Malaysia. – *Zootaxa* **3821**, No 4: 457–464.

Grismer L.L., Wood P.L., Syafiq M.F., Badli-Sham B.H., Rizal S.A., Ahmad A.B., Quah E.S.H. 2016. On the taxonomy and phylogeny of the skinks *Lipinia sekayuensis* Grismer, Ismail, Awang, Rizal, & Ahmad and *Lipinia surda* Boulenger from Peninsular Malaysia. – *Zootaxa* **4147**, No 1: 59–66.

Günther A. 1873. Notes on some reptiles and batrachians obtained by Dr. Adolf Bernhard Meyer in Celebes and the Philippine Islands. – *Proceedings of the Zoological Society of London* **1873**, No 11: 165–171, pls xvii-xviii.

Günther R. 2000. In alten Sammlungen aus Neuguinea entdeckt: zwei neue Arten der Gattung *Lipinia* (Squamata: Scincidae). – *Salamandra* **36**, No 3: 157–174.

Hedges S.B. 2014. The high-level classification of skinks (Reptilia, Squamata, Scincomorpha). – *Zootaxa* **3765**, No 4: 317–338.

Iskandar D.T., Tjan K.N. 1996. Amphibians and reptiles of Sulawesi, with notes on the distribution and chromosomal number of frogs: 39–46. In: Kitchener D.J., Suyanto A. (eds) *Proceedings of the First International Conference on Eastern Indonesian-Australian Vertebrate Fauna, Manado, Indonesia, November 22-26, 1994*. Perth, Western Australian Museum: ix + 174 pp.

Jeriomtschenko V.K., Szczerbak N.N. 1980. [About generic allocation of Ablepharid lizards (Reptilia, Sauria, Scincidae) of fauna of the U.S.S.R.] – *Vestnik zoologii* **4**: 10–15 [in Russian].

Koch A. 2012. *Discovery, diversity and distribution of the amphibians and reptiles of Sulawesi and its offshore islands*. Frankfurt am Main, Edition Chimaira: 374 pp.

Kramer E. 1979. Typenkatalog der Echsen im Naturhistorischen Museum Basel (BM), stand 1978. – *Revue suisse de zoologie* **86**, No 1: 159–166.

Lesson R.-P. 1829. Planche Reptiles No 3. In: *Voyage autour du Monde, Exécuté par Ordre du Roi, sur La Corvette de Sa Majesté, La Coquille, pendant les années 1822, 1823, 1824 et 1825. Histoire naturelle, Zoologie*. Atlas, Tome **2**. Paris, Arthus Bertrand, Paris: pl. Reptiles 1–7 + Poissons 1–38 + Mollusques 1–16. [plate is one of seven issued as part of Livraison 11, along with part of the text of Zoologie Tome **I** (II pt.)]

Linkem C.W. 2013. Molecular phylogenetics and biogeography of Sphenomorphini (Squamata: Scincidae). Ph.D. thesis, University of Kansas: vi + 249 pp.

Linkem C.W., Diesmos A.C., Brown R.M. 2011. Molecular systematics of the Philippine forest skinks (Squamata: Scincidae: *Sphenomorphus*): testing morphological hypotheses of interspecific relationships. – *Zoological Journal of the Linnean Society*

163, No 4: 1217–1243.

Mittleman M.B. 1952. A generic synopsis of the lizards of the subfamily Lygosominae. – *Smithsonian Miscellaneous Collections* **117**, No 17: 1–35.

Müller F. 1895. Reptilien und Amphibien aus Celebes. – *Verhandlungen der Naturforschenden Gesellschaft in Basel* **10**, No 3: 825–843.

Nguyen T.Q., Schmitz A., Tau T.N., Orlov N.L., Böhme W., Ziegler T. 2011. Review of the genus *Sphenomorphus* Fitzinger, 1843 (Squamata: Sauria: Scincidae) in Vietnam, with description of a new species from northern Vietnam and southern China and the first record of *Sphenomorphus mimicus* Taylor, 1962 from Vietnam. – *Journal of Herpetology* **45**, No 2: 145–154.

Ouboter P.E. 1986. A revision of the genus *Scincella* (Reptilia: Sauria: Scincidae) of Asia, with some notes on its evolution. – *Zoologische Verhandelingen* No 229: 1–66.

Peters W. 1867. Herpetologische Notizen. – *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* **1867**: 13–37.

Peters W. 1871. Über neue Reptilien aus Ostafrica und Sarawak (Borneo), vorzüglich aus der Sammlung des Hrn. Marquis J. Doria zu Genua. – *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* **1871**: 566–581.

Peters W., Doria G. 1878. Catalogo dei rettili e dei batraci raccolti da O. Beccari, L. M. D. d'Albertis e A. A. Bruijn, nella sotto-regione Austro-Malese. – *Annali del Museo Civico di Storia Naturale di Genova, Series 1,* **13**: 323–450, pls 1-7.

Pyron R.A., Burbrink F.T., Wiens J.J. 2013. A phylogeny and revised classification of Squamata, including 4161 species of lizards and snakes. – *BMC Evolutionary Biology* **13**: 93 (53 pp).

Sarasin P., Sarasin F. 1894. Reiseberichte aus Celebes. Erster Bericht. – *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* **29**: 351–401, pl. 13.

Sarasin P., Sarasin F. 1905. *Reisen in Celebes ausgeführt in den Jahren 1893-1896 und 1902-1903. Erster Band.* Wiesbaden, CW Kreidel's Verlag: xviii + 381 pp, vii maps.

Shea G.M., Greer A.E. 2002. From *Sphenomorphus* to *Lipinia*: generic reassignment of two poorly known New Guinea skinks. – *Journal of Herpetology* **36**, No 2: 148–156.

Smith M.A. 1935. *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Volume **II**. Sauria.* London, Taylor & Francis: xiii + 449 pp, 1 pl.

Stoliczka F. 1873. Notes on some Andamese and Nicobarese reptiles, with the descriptions of three new species of lizards. – *Journal of the Asiatic Society of Bengal, Part 2,* **42**, No 3: 162–169.

Supsup C.E., Redoblado B.R., Guinto F.M. 2016. First record of rare endemic tree skink *Lipinia vulcania* on Sibuyan Island, Philippines, with notes on its conservation and taxonomic status. – *Herpetological Review* **47**, No 1: 24–26.

Taylor E.H. 1917. Snakes and lizards known from Negros, with descriptions of new species and new subspecies. – *Philippine Journal of Science* **12**, No 6: 353-379, pls I–II.

Taylor E.H. 1919. New or rare Philippine reptiles. – *Philippine Journal of Science* **14**, No 1: 106–123, pls I–II.

Taylor E.H. 1922. Additions to the herpetological fauna of the Philippine Islands, I. – *Philippine Journal of Science* **21**, No 2: 161–206, pls 1–7.

Taylor E.H. 1935. A taxonomic study of the cosmopolitan Scincoid lizards of the genus *Eumeces* with an account of the distribution and relationships of its species. – *University of Kansas Science Bulletin* **23**: 1–643.

Vinciguerra D. 1892. Rettili e batraci di Engano raccolti dal Dott. Elio Modigliani. – *Annali del Museo Civico di Storia Naturale di Genova, Series 2,* **12**: 517–526.

Wanger T.C., Motzke I., Saleh S., Iskandar D.T. 2011. The amphibians and reptiles of the Lore Lindu National Park area, central Sulawesi, Indonesia. – *Salamandra* **47**, No 1: 17–29.

Welch K.R.G. 1982. Herpetology of the Old World. II. Preliminary comments on the classification of skinks (Family Scincidae) with specific reference to those genera found in Africa, Europe, and southwest Asia. – *Herptile* **7**: 25–27.

Welch K.R.G., Cooke P.S., Wright A.S. 1990. *Lizards of the Orient. A checklist.* Malabar, Robert E. Krieger: 162 pp.

Wrobel M. 2004. *Elsevier's Dictionary of Reptiles*. Amsterdam, Elsevier: ix + 758 pp.

Zweifel R.G. 1979. Variation in the scincid lizard *Lipinia noctua* and notes on other *Lipinia* from the New Guinea region. – *American Museum Novitates* **2676**: 1–21.

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Plate 2

Shea, G.M.: Generic allocation of the enigmatic scincid lizard *Lygosoma inconspicuum* from Sulawesi …

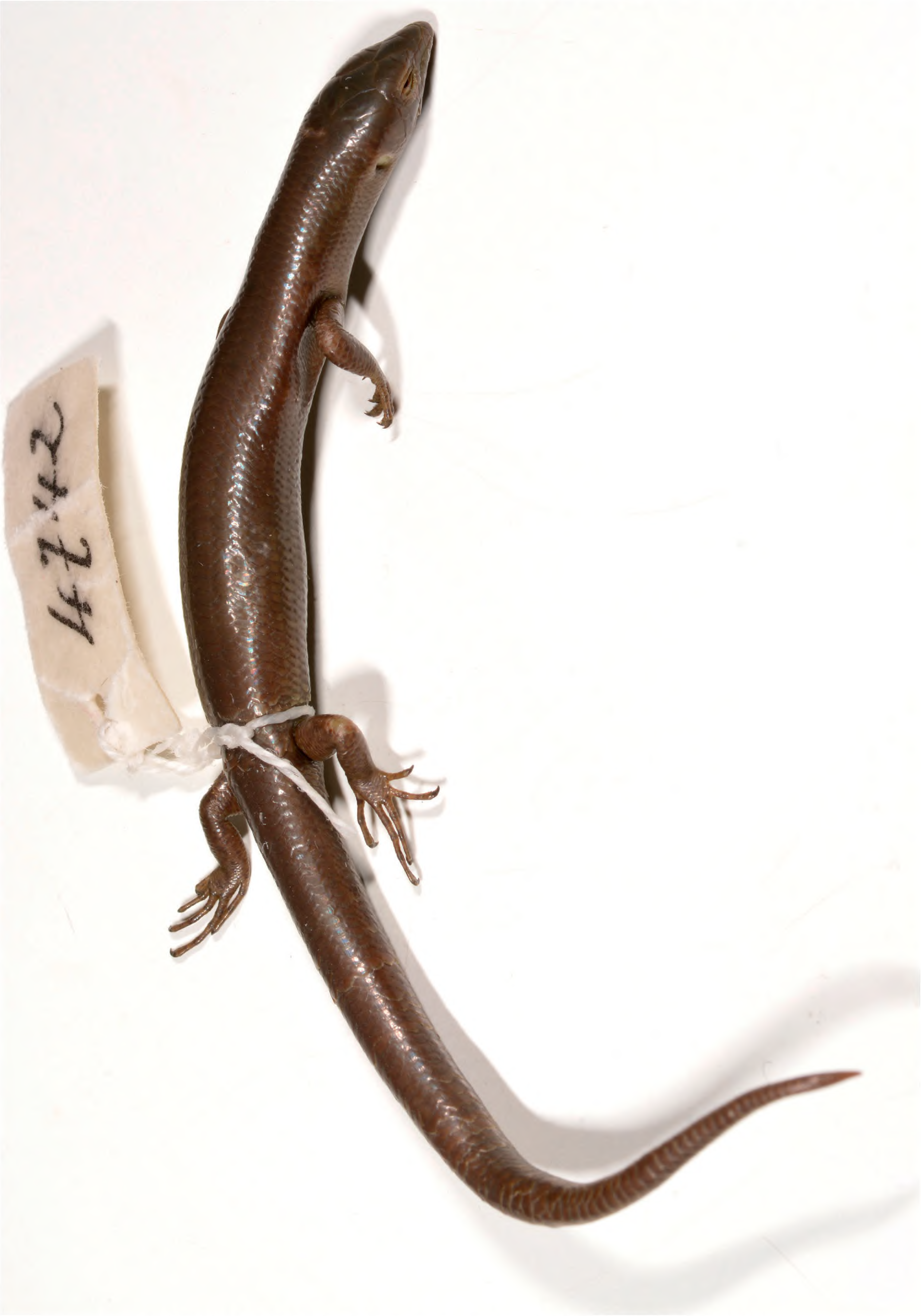
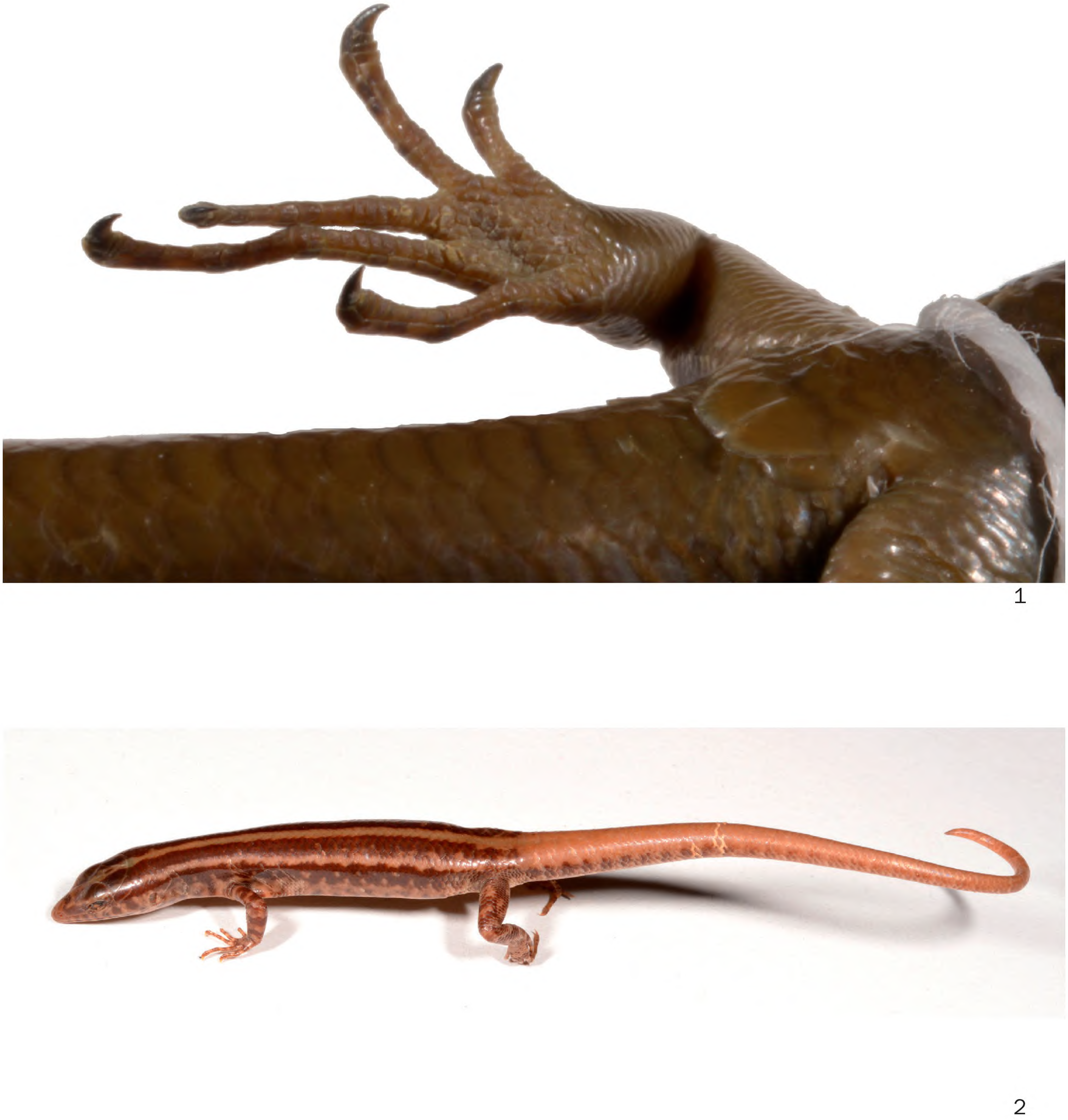


Figure 1. Holotype of *Lygosoma inconspicuum* F. Müller, 1895: NHMB 4742.

Plate 3

SHEA, G.M.: Generic allocation of the enigmatic scincid lizard *Lygosoma inconspicuum* from Sulawesi ...



Figures 1-2. Scincid lizards from Wallacea. 1 – Details of ventral surface of right hind foot and preanal region of holotype of *Lygosoma inconspicuum* F. Müller, 1895; 2 – One of the three extant syntypes of *Lygosoma (Mocoa) noctua* var. *ternatensis* Peters, Doria, 1878. All three syntypes are registered under the number MSNG 27976, and are not individually tagged.